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09/880,859	06/15/2001	Martin E. Lee	102305.05	7353

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EXAMINER	
RO, BENTSU	
ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 08/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/880,859	LEE, MARTIN E.	
	Examiner	Art Unit	
	Bentsu Ro	2837	

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 03 March 2003 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) See Continuation Sheet is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) all that are pending is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 17 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Continuation of Disposition of Claims: Claims pending in the application are 34-44,47-50,52-78,80-83,87-104,106-113,116,117,120-123,130-133,135-138,140-143,146,147,150-154 and 157-171.

FIRST OFFICE ACTION AFTER RCE

1. First group claims (34-41, 44, 52, 56, 59, 63, 66, 67, 70, 71); second group claims (72-78, 80, 81, 91, 92, 96, 99, 100, 102, 103); third group claims (104, 106, 109, 110, 112, 116, 130, 131, 132) and fourth group claims (133, 135, 138, 140, 142, 146, 154) are all rejected under 35 U.S.C. 102(b) as being clearly anticipated by Reeds US Patent No. 4,891,526. (This reference was cited by applicant in the PTO-1449, paper #4, filed June 15, 2001.)

The following chart compares the first group claims with Reeds teaching.

<u>The claims:</u>	<u>Reeds teaching:</u>
34. (Twice Amended) A method of making a microlithography system that form an image onto an object, comprising the steps of:	Reeds teaches an apparatus and a method of positioning an object, specifically making an image onto a semiconductor wafer, see abstract; Fig. 1 shows a wafer 2, which is an object wherein an image is formed;
providing an irradiation apparatus that irradiates the object with radiation to form the image on the object;	column 1, line 14-15 states "....for use in masked ion-beam lithography."; Fig. 1 shows beam axis 6; thus, the ion-beam is an irradiation apparatus;
providing a movable stage associated with the irradiation apparatus,	Fig. 1 shows a x-y stage plate 12 which is a movable stage associated with the ion-beam irradiation;
the movable stage having a first mirror;	Fig. 1 shows a x-position mirror 30 positioned on the x-y stage plate 12;
providing a first support structure;	Fig. 1 shows a base 28;
providing a second support structure dynamically isolated from the first support structure,	Fig. 1 shows a stator 24; the stator 24 is dynamically isolated from the base 28 by three adjustable flexible mounts 26a-26c (Fig. 1 shows 26a only);

the second support structure including a base member that supports the movable stage;	Fig. 1 also shows a θ-rotation stage platform 20 which could be read as a base member;
providing a drive	Fig. 7 shows a y-drive motor 36 and the associated elements (not shown in Fig. 7);
having a first portion connected to the movable stage	Fig. 3 shows a y-drive bar 50, the y-drive bar 50 is connected to the x-y stage plate 12;
and a second portion connected to the first support structure	Fig. 3 shows a y-drive motor 36; Fig. 7 shows that the y-drive motor 36 is connected to the base 28 via a mounting flange 38;
to move the movable stage in a two-dimensional plane	the x-y stage plate 12 is movable in a two-dimensional plane via linear bearings 14a, 14b, and 18a (shown in Fig. 1);
such that a reaction force exerted by the movement of the movable stage is transferred to the first support structure,	see Fig. 3, when plate 12 is moved by the y-drive bar 50, the reaction force of the movement of the y-drive bar 50 is transmitted to the y-drive motor 36 via the rack gear 48 to the y-drive pinion gear 46 and the pressure rollers 52, 53; the motor 36 is mounted on the base 28 (see Fig. 7), thus, the reaction force of the movement is therefore transferred to the base 28, which is a first support structure;
the second portion of the drive not contacting the movable stage; and	Fig. 3 clearly shows that the y-drive motor 36 does not contact with the x-y stage plate 12;
providing a position detector that cooperates with the first mirror to detect a position of the movable stage in the two-dimensional plane,	Fig. 1 shows an interferometer 34 that cooperates with the x-position mirror 30;
the position detector being supported by the second support structure.	Fig. 1 shows that the interferometer 34 is supported by the stator 24.

35. A method according to claim 34, wherein the second support structure supports the irradiation apparatus.	Fig. 1 shows a beam axis 6, thus the irradiation apparatus is above the wafer 2; the irradiation apparatus could be supported by (1) the x-y stage plate 12, or (2) the stator 24, or (3) the base 28; based on the examiner's analysis, the supported by (1) and (3) should be ruled out because: if supported by plate 12, then the beam will move simultaneously with the wafer, thus, the complete structure of image cannot form onto the wafer but only a single spot, which is not the function of the apparatus; if supported by the base 28, then, there is a vibration problem between the irradiation apparatus and wafer, any vibration on the wafer or irradiation apparatus will destroy the image on the wafer; thus, the only possible support location is supported by the stator 24; the irradiation apparatus, if supports by the stator 24, the above-mentioned problems are all eliminated.
36. A method according to claim 35, wherein the irradiation apparatus includes a projection system.	The ion-beam is generated by a projection system.
37. A method according to claim 36, wherein the projection system optically projects the image.	The ion beam, according to physics, is a type of optical beam.
38. A method according to claim 36, wherein the movable stage is located below the projection system.	Fig. 1 shows that the wafer 2, the plate 12, etc. are all located below the ion-beam axis 6.
39. A method according to claim 35, wherein the irradiation apparatus includes a mask holder that holds a mask that defines the image.	Column 1, lines 23-27 describes a mask for allowing the ion-beam to pass through to form a circuitry onto a semiconductor wafer.

40 and 41. A method according to claim 34, wherein the second support structure has a first portion that supports the movable stage and a second portion that supports the irradiation apparatus.	Fig. 1 shows a stator 24, which is a first portion; any portion (not shown) that rigidly fixed onto the stator 24 and supports the irradiation apparatus is a second portion.
44. A method according to claim 34, wherein the movable stage is a substrate stage on which the object is supported.	The x-y stage plate 12 supports the wafer 2 as shown in Fig. 1.
52. A method according to claim 34, wherein a substrate stage is movable over a surface of the base member on a bearing.	Fig. 1 shows the wafer 2 movable over the θ-rotation stage platform 20 via linear bearings 14a, 14b, 18a.
56 (and 59). A method according to claim 34, wherein the second support structure is supported on a foundation.	The ground (not shown) is a foundation.
63. A method according to claim 34, wherein the drive rotates the movable stage on an axis of the movable stage.	Fig. 1 shows a rotation stage including a rotor drum 21.
66.	Same as claim 44.
67. A method according to claim 34, wherein the drive moves the movable stage in the two-dimensional plane, including movement in the plane in a first linear direction, in a second linear direction and in a rotative direction on an axis of the movable stage.	According to Fig. 1, the x-y stage plate 12 can be moved in x-direction and y-direction via linear bearings 14a, 14b, 18a, and also rotatable via rotor drum 21.
70.	Same as claim 44.
71. A method according to claim 34, wherein the first support structure at least partly supports the drive.	The base 28 supports the y-drive motor 36 as shown in Fig. 7.

The second through fourth group claims are basically similar to but broader than that of the first group claims, explanation is omitted except claims 102, 103, 130 and 131.

Regarding these claims, the "first member" reads onto the y-drive motor 36. The motor 36 has both a magnet and a coil because most dc motors have at least one magnet and one coil. Further, the motor is supported by the base 28, which is a first support member (claim 102) or a first support structure (claim 132).

2. First group claims (34-44, 47-50, 52-56, 59-62, 71); second group claims (72-78,80-83, 87-96, 99, 100, 102, 103); third group claims (104, 106, 109, 110, 112, 116, 117, 120-123, 130-132); fourth group claims (133, 135, 138, 146, 147, 150-154, 157) are all rejected under 35 U.S.C. 102(b) as being clearly anticipated by Itoh et al US Patent No. 5,260,580. (This reference was cited by applicant in the PTO-1449, paper #4, filed June 15, 2001.)

The following chart compares the first group independent claim 34 with Itoh et al teaching. The dependent claims of the first group are explained thereafter.

The claims:	**Itoh et al teaching:**
34. A method of making a microlithography system that forms an image onto an object, comprising the steps of:	see Fig. 10, the exposure system;
providing an irradiation apparatus that irradiates the object with radiation to form the image on the object;	Fig. 10 shows a silicon wafer 910 to be irradiated by the radiation source 901;
providing a movable stage associated with the irradiation apparatus,	Fig. 10 shows a movable stage 911; Figs. 1 and 2 show the structure of a movable stage 2;
the movable stage having a first mirror;	Fig. 1 shows a mirror 52 on the movable stage 2;
providing a first support structure;	Fig. 2 shows a floor (the ground symbol);
providing a second support structure dynamically isolated from the first support structure,	Fig. 2 shows a stationary base 1, a movable stage 2, an attachment plate 76, a second yoke 72, etc., these elements together constitute a second support structure; it is noted that these elements are dynamically isolated from the floor by dampers 6_1 and 6_2;

the second support structure including a base member that supports the movable stage;	Fig. 2 shows a stationary base 1 which is a base member that supports the movable stage 2;
providing a drive having a first portion connected to the movable stage	Fig. 2 shows permanent magnets 43_1, 43_2, 73_1, 73_2 that constitutes a first portion of a drive and connects to the movable stage 2;
and a second portion connected to the first support structure	Figs. 1 and 2 show a second drive coil 71 and the first drive coil 41, these coils are connected to the floor via support plates 8_1, 8_2, 35_1 and 35_2; thus, these coils constitute a second portion of the drive; it is important to note that the Fig. 2 drawing has an error in that the support plate 8_1 should connect to the second drive coil 71, not to the second yoke 72;
to move the movable stage in a two-dimensional plane	Fig. 6 shows that the stage can be moved in a two-dimensional plane;
such that a reaction force exerted by the movement of the movable stage is transferred to the first support structure,	when the stage 2 moves, the reaction force is transferred to the coil 71 or 41; the reaction force from coils 71 or 41 is absorbed by the floor;
the second portion of the drive not contacting the movable stage; and	the coils 41 and 71 do not contact with the movable stage as clearly shown in Fig. 2;
providing a position detector that cooperates with the first mirror to detect a position of the movable stage in the two-dimensional plane,	Fig. 1 shows a laser distance measuring device 51;
the position detector being supported by the second support structure.	albeit not clearly shown, the laser device must be supported by the stationary base 1 so that the relative movement of the movable stage 2 with respect to the stationary base can be measured.

Regarding claim 35, the irradiation apparatus is located at the same frame of the detector so that the relative movement of the movable stage 2 with respect to the stationary base can be measured.

Regarding claim 36, the irradiation apparatus obviously is a projection system because the radiation projects outward toward the object.

Regarding claim 37, Itoh's Fig. 10 clearly shows an alignment "optical system" 900 and "far ultraviolet radiation source" 901 which is also an optical system for optically projecting the image.

Regarding claim 38, Itoh's Fig. 10 shows that the movable stage 911 located below the projection system.

Regarding claim 39, the mask holder and the mask are required for all print circuit patterns, including Itoh's.

Regarding claims 40 and 41, the first portion and the second portion of the second support structure can read onto any part of the base 1 (see Itoh's Fig. 2) that supports the movable stage 2 and the irradiation apparatus (not shown).

Regarding claim 42, Itoh's Fig. 1 shows a mirror 52 and a laser distance measuring device 51. The second mirror is inside the laser distance measuring device 51. The laser distance measuring device 51 can be an interferometer. The interferometer has a moving mirror and a fixed mirror. Thus the fixed mirror is inside the measuring device 51.

Regarding claim 43, Itoh's first embodiment (Figs. 1-3) does not show any guidance, such as guide groove, guide bar, or guide plate. Therefore, the first embodiment of Itoh's is a guideless stage.

Regarding claim 44, Itoh's Fig. 10 shows a silicon wafer 910 locates on the top of the movable stage 911.

Regarding claims 47, 48, 49, 53, 54, Itoh's Fig. 2 teaches fluid pressure non-contact bearings 32_{11}, 32_{12}, 32_{21} and 32_{22}.

Regarding claims 50, 55, Itoh's Fig. 2 shows permanent magnets 43_1, 43_2 and a first drive coil 41. The coil and the permanent magnets act as a non-contact bearing.

Regarding claim 52, Itoh's movable stage 2 is moving over the surface of the stationary base 1, see Fig. 2, for example.

Regarding claims 56 and 59, Itoh's Fig. 2 shows the stationary base 1 supported by the ground via two dampers 6_1 and 6_2.

Regarding claims 60 and 61, Itoh's Fig. 2 shows drive coils 41, 71 and permanent magnets 73_1,73_2, 43_1, 43_2. These elements constitute linear motors.

Regarding claims 62 and 71, Itoh's Fig. 2 shows that the second drive coil 71 being supported by the ground, which is a first support structure.

The second through fourth group claims are very similar to that of the first group claims, explanation is omitted.

3. Claims 57, 58, 97, 98, 107, 108, 136, 137 are all rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al.

Regarding these claims, Itoh's Fig. 2 shows two dampers 6_1 and 6_2 located between the ground and the stationary base 1. It is noted that the stationary base 1 is a part of the second support structure. Thus, Itoh clearly teaches a "vibration absorbing assembly" between the foundation and the second support structure. (Claims 58, 98, 108, 137.)

However, Itoh et al do not show the dampers as a "block". (Claims 57, 97, 107, 136.)

It appears to the examiner that one cannot simply screw a damper to the ground and to the stationary base 1 to damping out the vibration of the ground from the stationary base 1 because the stability problem. One must have certain structure to hold the dampers so that the damper structure becomes a single unit for easy assemble or insertion into the lithography system.

In view of the foregoing, a block is simply an obvious design choice.

4. Claims 64, 68, 101, 111, 113, 141, 143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reeds (Pat. No. 4,891,526) as applied to claims 34, 63, 67, 72, 104, 110, 112, 133, 140, 142 above, and further in view of Novak US Patent No. 5,760,564.
(The Novak's patent was previously cited by applicant in the same PTO-1449.)

Regarding to these claims, Reeds does not teach a yaw control. However, a yaw control is taught by Novak.

In view of Novak's teaching, it would have been obvious to a skilled person in the art to add a yaw control to Reeds system to achieve the same subject matter as claimed.

Then why??? Adding a yaw control will increase the versatility of the system. Without yaw control, the movement of the stage is too rigid. Adding yaw control increases the freedom of movement, thus increase the versatility of the system. Because yaw control has at least such an advantage, it would have been obvious to add a yaw control to the Reeds system to increase the versatility of the system.

5. Claims 63, 65, 67 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh's 5,260,580 as applied to claim 34 above, and further in view of Reeds' 4,891,526, or vice versa.

Regarding claims 63 and 67, Itoh does not teach the rotation of the stage 2. However, the rotation of the stage is taught by Reeds. Reeds Fig. 1 teaches the rotation of the plate 12 on a rotor drum 21. It would have been obvious to a skilled person in the art to add a rotor drum of Reeds to the stage of Itoh to achieve the same subject matter as claimed.

Why??? Adding rotation to the Itoh's stage increases the versatility of the system. The system will have an extra freedom of movement. Because extra freedom of movement increases the versatility of the system, it would have been obvious to do so.

Regarding claims 65 and 69, Itoh teaches a guideless stage as explained previous in paragraph 3 above. Further explanation is un-necessary.

6. Claims 158-171 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al US Patent 5,260,580.

OR

Alternatively, claims 158-171 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al US Patent 5,260,580 in view of Franken et al US Patent No. 5,150,153. (This reference was cited by applicant in the same PTO-1449.)

Regarding claim 158, the object, the projection system are shown in Itoh's Fig. 10. The object stage 2 is shown in Figs. 1 and 2. The mirror is shown in Fig. 1. The support structure is shown in Fig. 2 as the stationary base 1. The vibration absorbing assembly is shown as dampers 6_1 and 6_2. The drive reads onto the permanent magnets 73_1, 73_2, 43_1, 43_2 and the coils 41, 71. The reaction frame reads onto the floor (the ground symbol) or any foundation (not shown). The position detector reads onto the laser distance measuring device 51 (Fig. 1).

With respect to claim 158, Itoh does not show *"a holding surface of the vibration absorbing assembling being higher than a surface of the base member and lower than a holding surface of the mask"*.

This structure is considered an obvious design choice. One can fasten or fix the dampers at any position along the bottom or the sides of the stationary base, and the overall function of the dampers will not change because the dampers support the weight of the stationary base and all other elements mounted above. The location of the dampers will not change the weight of the stationary base. However, one must consider the stability of the support position. The best position will be at the extreme ends of the stationary base 1, namely, at both sides of the base 1. The dimension of the fixing bracket or frame is not a major concern.

In view of the foregoing, one can use a fixing bracket or frame to fasten the dampers to the stationary base 1 at both side with a dimension of the fixing bracket or frame such that the holding surface of the vibration absorbing assembling being higher than a surface of the base member and lower than a holding surface of the mask.

Alternatively, Franken et al Fig. 1 shows a corner portion 23 placed onto a lower frame support 25. A spring member and a damping member are provided in between, see column 5, lines 7-8. The support frame 25 can be made longer or shorter so that the holding surface of the vibration absorbing assembling being higher than a surface of the base member and lower than a holding surface of the mask.

The subject matters of claims 159, 160, 162-167, 170 and 171 have been discussed previously, repetition is deem un-necessary.

Regarding claim 161, the height of the holding surface of the absorbing assembly is an obvious design choice as explained previously with respect to claim 158 above.

Regarding claims 168 and 169, Franken et al Fig. 1 shows a lens system 2 supported by the mounting member 5. It is noted that the mounting member 5 is a stationary base similar to that of Itoh's stationary base 1.

7. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number 703 308-3656.

August 15, 2003

Bentsu Ro
Bentsu Ro
Primary Examiner